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Urbana and Champaign
Illinois

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THE MILK SUPPLY OF THE CITIES OF URBANA AND CHAMPAIGN, ILLINOIS.

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This Association has heard how large cities with generous appropriations, staffs of inspectors and well organized health departments, backed by police power, improve their milk supplies, but it has not been told of the milk problem in small cities. Therefore, the situation in Urbana and Champaign is described in the belief that the story is interesting in itself and that it exemplifies conditions throughout the United States in cities of like size and similar sanitary education or advancement.

The twin cities, as they are called, are in Champaign County, 126 miles southwest of Chicago. From a sanitary standpoint they compose a single community, having an area of 6 square miles, a resident population of 22,500, and a floating population 4,300, composed of the students and faculty of the University of Illinois. Because of the division of the community into two cities it is not governed by uniform laws and so civic problems are handled differently. Amongst other things, this is true of the sanitation, including the administration of the milk codes of the two cities. Urbana trusts in a board of health of two members, physicians, at a salary of \$100 a year each, and Champaign in a health officer, a physician, at \$180 a year. However, the milk codes of the two cities, which were enacted about two years ago, are practically identical, having been drawn up by B. R. Rickards, then a member of the University faculty. The codes were thought by Professor Rickards to be well adapted to the conditions that obtain in the two cities. The principal provisions are:

1. All persons selling milk shall take out a license therefor.
2. No whole milk shall be sold that (a) contains over 100,000 bacteria per cubic centimeter; that (b) has a tempera-

ture of more than 60° F., or that (c) contains less than 12 per cent total solids of which not less than 3.25 per cent shall be butter fat.

3. No milk shall be sold that contains water or any added foreign substance.

4. No milk shall be sold from any cow within 15 days before or 5 days after parturition, and no milk shall be sold at any time from cows with inflamed udders or from cows known to be tuberculous.

5. Dealers must notify the City Clerk of the occurrence of communicable disease in his family or amongst his employees.

6. Milk bottles shall not be removed from premises whereon infectious disease exists.

7. Wagons and stores wherefrom milk is offered for sale must be clean. Milk must be sold in bottles or in original covered containers.

8. Milk containing over 100,000 bacteria per cubic centimeter shall be considered unfit for sale and shall not be pasteurized.

9. The Mayor shall appoint some one to collect milk samples, at least once in two weeks, from each licensed dealer, and to submit them to a competent person for chemical and bacterial analysis. The results of these analyses shall be open to public inspection in the offices of the city clerks.

10. Fines and the revocation of the license are provided as suitable penalties for infraction of the codes.

Soon after the enactment of these ordinances, verbal agreements were made with the two cities that samples collected for analysis should be examined at the University free of charge. Professor Rickards made this promise because he was actively interested in getting the ordinances passed, and because he believed that the University had a responsibility to the students in the matter of making a safe, wholesome milk supply available for their use. The result sought in the passage of these laws was not attained, for there has been virtually no attempt to enforce them. In Urbana thirty (30) licenses have been

taken out in the two years that have lapsed since the passage of the ordinances and no samples of milk have been submitted for analysis. In Champaign, 56 licenses were taken soon after the ordinance was passed and a milk inspector collected a few samples, but in effect the law has been dead, though within a few weeks past a newly appointed health officer has had a good many samples collected. It is believed that no one in either city has ever been punished for violating the code. In truth, then, here is an unregulated milk supply, concerning which the following facts are presented from data that have been gradually accumulating during the past two years. The estimates of the quantity of milk used are based on careful inquiry amongst dealers and have been checked up by questioning restaurateurs, ice cream manufacturers, confectioners, and others. It is believed that the figures are right within ten per cent.

The bulk of the milk consumed in the twin cities is produced on the flat prairie land of the corn belt, and is brought by wagon from farms lying within a radius of ten (10) miles from the University. Some milk is brought by interurban railway from the following places:

<i>City.</i>	<i>Miles</i>	<i>Gallons Daily.</i>
Koch Crossing	6	15
Bondville	7	20
St. Joseph.....	10	15
Rantoul	14	5
White Heath.....	17	60
Total.....		115

By steam railroad milk comes from:

<i>City.</i>	<i>Railroad.</i>	<i>Miles.</i>	<i>Gallons Daily.</i>
Bloomington	Big 4	60	24
Paxton	I. C.	25	24
Kankakee	I. C.	72	24
Manteno	I. C.	80	24
Chicago	I. C.	126	Occasionally
Total.....			96

Farmers are paid 20c. a gallon for milk delivered at the creameries. Bottled milk sells at 10c. a quart and 5c. a pint; loose milk sells at 8c. a quart, or in a few places at 7c.

The total daily consumption of milk is 1,200 gallons. The milk is distributed by 20 dairymen who have been in the business long enough to be regarded as permanent purveyors, and by 20 to 25 farmers who maintain a wagon route for a month or so and then stop delivery until the spirit moves them to begin again. Two dairymen deliver thirty (30) per cent of the supply and seven dairymen deliver seventy (70) per cent. The daily supply is absorbed in the following manner:

	<i>Gallons.</i>
Confectioners	150
Ice cream plants.....	100
Restaurants	200
Fraternities and clubs.....	100
Stores	20
Families	630
	<hr/>
Total.....	1,200

Twenty (20) per cent of the milk sold in restaurants is bottled, the rest is dipped. The confectioners, in addition to receiving milk from the local dairymen, receive milk from Chicago and Bloomington, and the ice cream plant uses condensed milk from the same cities. The bakeries use very little whole milk; condensed milk, milk powder and skim milk taking its place. Since dairying is regarded by the average corn belt farmer as of less importance than crop growing, it follows that dairymen have little capital invested in the milk business. Indeed, tenant farmers often find it difficult to get their landlords to so much as keep the farm buildings in repair, and those owners who are willing to expend money in improving the lighting and ventilation of barns, building of milk houses and cement construction are more than rare. In general, herds are not more than of fair quality and are not tuberculin tested; few barns have cement floors, equipment is scanty and old-

fashioned; milk, if cooled at all, is cooled with well water, and cleanliness is not unduly emphasized. The University dairy is the only one equipped to sterilize milk bottles, consequently, there is the ever present possibility of a bottle-borne epidemic occurring.

About 18 months ago, H. E. McNatt, of the Dairy Department of the University, scored a good many dairies supplying Urbana and Champaign. Twenty (20) of these are still in business; they have an average score of 11.9 for equipment, 13.1 for methods, and a total average score of 25.5 out of a possible 100. This is believed to fairly represent the state of the average dairy farm in the vicinity. Under such conditions it is difficult to produce milk that is of uniform quality or even milk that is tolerably clean.

From time to time the City of Champaign, dealers and others have furnished samples of milk to the Dairy Department of the University to have the fat content determined and bacterial counts made. In this way considerable information concerning the quality of milk supplied by the different dealers has been acquired. The average results that have been obtained on the milk of the principal dealers are these:

Dealer.	No. of Samples.	Lacto-meter	% Fat.	Bacteria per c.c.
L. D. Wilson.....	37	31.3	3.5	14,900
Urbana Dairy.....	17	31.7	4.6	453,000
Champaign Creamery	65	31.4	4.1	196,000
H. P. Stinespring....	23	32.6	4.3	49,000
E. N. Kirby.....	6	32.0	4.6	44,000
Rogerson	3	30.8	4.0	106,000
H. G. Fry.....	6	33.0	4.3	34,000
E. Cline.....	5	31.1	4.3	89,000
Pasteurized milk from Peoria, Bloomington and Chicago.....	14	32.8	3.5	240,000
Total.....				1,225,900
Average.....				136,211

These samples were taken in the cooler months of the year when bacterial counts would run lower than in summer time.

Perhaps the best picture of milk offered the public is obtained from the results of tests that were made in October, 1913, of the milk of all the producers of two of the large distributors, to wit:

DAIRY A.

October 14, 1913.

No.	Lactometer.	% Fat.	% Acid.*	Number of Acid Forming Bacteria per cc.	Total Number of Bacteria per c.c.
1	31.2	4.0	.187	60,000	210,000
2-D	31.3	4.2	.1835	200,000	290,000
3	30.2	4.8	.180	800,000	800,000
4	31.2	3.8	.216	120,000	150,000
5	32.1	5.0	.169	700,000	1,000,000
6	30.6	3.9	.187	60,000	430,000
7	31.2	3.9	.191	no acid colonies	20,000
8	31.5	4.2	.177	200,000	290,000
9	30.0	3.5	.192	140,000	280,000
10	32.1	4.8	.169	20,000	160,000
11	31.4	4.3	.180	70,000	120,000
12	30.6	4.0	.173	2,500,000	3,800,000
13	31.2	3.4	.187	220,000	370,000
14	31.9	3.75	.187	no acid colonies	600,000
15	30.0	3.2	.216	825,000	830,000
16	31.6	3.6	.205	90,000	900,000
17	32.5	4.7	.223	no acid colonies	430,000
Wil	30.7	3.7	.1655	150,000	234,000
100	31.3	3.9	.180	300,000	1,700,000
Total.....					12,614,000
Average.....					664,000

* Expressed as Lactic Acid.

DAIRY B.

October 17, 1913.

No.	% Fat.	% Acid.*	No. of Acid Forming Bacteria per c.c.	Total Number of Bacteria per c.c.
1	4.3	.180	170,000	410,000
2	3.1	.213	7,390,000	7,400,000
3	3.8	.184	740,000	930,000
4	4.0	.216	3,950,000	4,000,000
5	3.6	.234	49,990,000	50,000,000
6	3.2	.220	408,000	410,000
7	4.0	.220	900,000	1,600,000
8	2.7	.220	570,000	670,000
9	3.4	.188	2,500,000	2,600,000
10	3.6	.216	8,000,000	8,600,000
11	2.9	.162	1,060,000	1,460,000
12	4.4	.205	25,200,000	26,500,000
13	3.3	.1945	6,750,000	6,800,000
14	6.2	.220	1,430,000	1,650,000
15	3.0	.177	1,990,000	2,500,000
16	3.7	.229	0	27,000,000
17	3.4	.198	470,000	500,000
18	5.5	.1765	110,000	240,000
19	4.4	.213	32,495,000	32,500,000
20	4.0	.162	110,000	120,000
21	3.6	.159	140,000	170,000
Total.....				176,060,000
Average.....				8,383,000

The owners of these dairies have said that the farmers deliver the milk to them the year round uniced; that from late spring to early autumn its temperature ranges between 60° and 75° F. and that the farmers often fail to cool the morning's milk. So it seems probable that the high bacterial counts are

* Expressed as Lactic Acid.

in great part due to lack of icing, but they are not to be explained wholly on this ground, for most of the milk yields dirt aplenty on being passed through a Wisconsin or a Wizard sediment tester.

A factor in the situation is the University Dairy which is operated by the University of Illinois for instructional purposes and which puts out daily 75 gallons of clean milk and cream from tuberculin tested cows. Milk is delivered in Urbana and Champaign to both faculty people and town folk. The demand for it greatly exceeds the supply because it is known to be produced from healthy animals and to be carefully handled. Some attempt is made to provide for invalids and ailing babies during their necessity, but otherwise the customers change but little from year to year and so the influence of the dairy on the trade may be closely estimated by dealers. The following table shows the results of tests that have been made during the past two years of the milk of the dairy.

University Dairy.

August 16, 1911—December 31, 1911.

	No. of Samples.	% Fat.	Bacteria per C.C.
Milk	9	3.6	27,400
Standardized milk...	78	4.1	428,200
Cream	40	27.8	474,900

January 1, 1912—December 31, 1912.

Milk	264	3.6	37,800
Standardized milk...	346	4.1	46,500
Cream	299	25.1	130,000

January 1, 1913—August 31, 1913.

Milk	236	3.3	10,500
Standardized milk...	235	4.1	11,100
Cream	236	23.9	85,500

These figures need some comment. When Professor Rickards took charge of the University Dairy it was putting out a milk that was not particularly satisfactory and that had a high

and variable bacterial content. Steps were at once taken to improve the supply and efforts in this direction are still continuing. The high bacterial count in 1912 and 1913, is in part to be accounted for by the fact that the natural milk is enriched or standardized to 4 per cent by the addition of cream. This cream is obtained by skimming the night's milk with a separator, is kept overnight in an ice-box and is added to the morning's milk. There is nothing commendable in this practice but it was made necessary by the fact that the University Dairy advertised 4 per cent milk at a time when its herd, being composed almost wholly of Holsteins, did not produce milk of this richness. More Guernsey and Jersey blood has been introduced into the herd and it is hoped that soon standardizing may be abandoned.

The University Dairy provides practical experience for students taking the course in City Milk Supply; it provides a good quality of raw milk for a few, and it has enabled dairymen to get a good price for their milk because it has created discriminating customers and so a demand for good milk.

From what has been said it must be apparent that good milk is difficult to obtain in Urbana and Champaign. The milk supplied the towns should be much better than it is. Under present conditions mothers are at their wits end to get milk that they feel is safe to carry babies through the first two years of infancy, and the managers of fraternities and other student clubs find it impossible to get milk of the quality they desire. However, the supply has been improved in the last two years by, first, public lectures on milk given by members of the Dairy Department and others, and by efforts to interest farmers through inspection of their farms, etc.; second, by one of the large dealers slowly and steadily eliminating slovenly farmers from his producers; third, by some of the smaller dealers seeing a chance to get trade by improving their farms and methods. Still, results are coming very slowly, and it seems unlikely that any great improvement will be made within a reasonable time.

To the writer it seems likely that the problem will be solved in one of the following three ways:

1. By some local man putting enough capital into the business to enable him to operate his farm on a large scale, with modern labor-saving machinery, and a first-class equipment for bottling milk, and sterilizing milk bottles, etc.

Amongst the difficulties such a one would have to contend with are bad roads and the fluctuating demand for milk, caused by the floating population of faculty and students. Thus, this population on June 1, 1913, numbered 4,014; by July 1 it was reduced to 784, and on the first of August to nothing. On October 1 it was increased to 4,384.

2. Some large dealer in Chicago, Peoria, Kankakee or elsewhere may capture the trade from the local dealers and farmers by shipping in milk and at the same time inaugurating a delivery system that shall have courteous employees and be reliable. That this has not actually happened is, perhaps, because the entire milk trade of the two cities is not large enough to be particularly tempting to capital.

3. A serious milk borne epidemic may convince both business men and the University that an efficiently regulated supply is a necessity.



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